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Dynamics of Inorganic Components in Lake Waters from Terra Nova Bay, Antarctica

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Water and Suspended Particulate Material (SPM) samples analyzed in this work were collected in the austral summer 2011/12 from six shallow Antarctic lakes (Carezza, Edmonson Point 14 and 15a, Gondwana, Inexpressible Island 10b and Tarn Flat 20) of Terra Nova Bay (Northern Victoria Land, Antarctica). The total concentrations of a large suite of inorganic analytes were determined, in order to gain insight into the natural processes regulating species distribution, define natural background values and detect possible present or future local and/or global anthropogenic contamination. Lake water composition was found to be influenced by marine spray, lake geographical position and meltwater input. Seasonal variability was also evaluated for every analyte, and explained with regards to its origin. Multivariate chemometric techniques were performed in order to identify groups of samples with similar characteristics and find out similarities and correlations among variables. The variability observed within the water samples is closely connected to the sea spray input; hence, it is primarily a consequence of geographical and meteorological factors, such as distance from the ocean and time of year. Higher element concentrations have been found in SPM than in water, showing that adsorption processes might take place. SPM samples were also observed with a SEM, and many diatoms belonging to different species were found. No evidence of a detectable metal contamination was found in the investigated area.

[1] Abollino O. et al, Distribution of major, minor and trace elements in lake environments of Antarctica, Antarctic Science, 2004, 16 (3), p. 277-291; [2] Abollino O. et al, Characterization of the element content in lacustrine ecosystems in Terra Nova Bay, Antarctica, Microchemical Journal, 2012, 105, p. 142-151.

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